Ontario's Transportation Technology Transfer Digest • February 2004 • Vol 10 Issue 1

2 Cathodic Protection Continued
3 Hand-held Bridge Data Entry Tablet
4 Asset Management Update
5 CSVA Award
6 Pavement Marking Innovations
7 PIARC Conference
CDGPS Technology

PLEASE CIRCULATE:

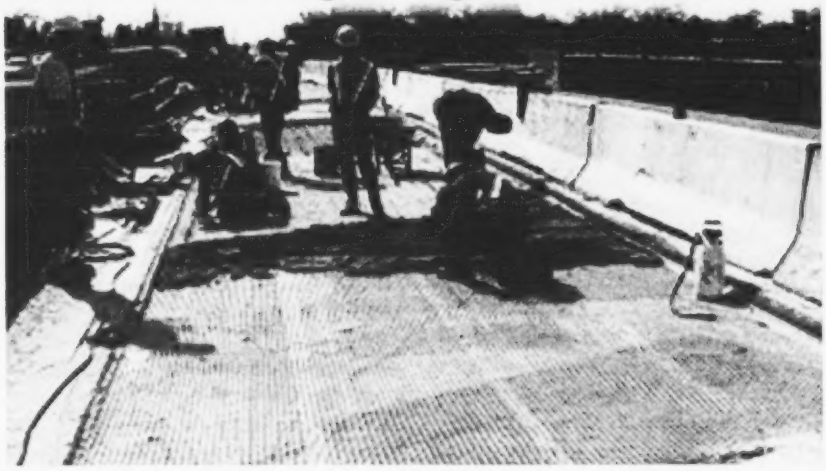
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

New Pavement Marking Innovations See pg. 6

CANADA POST / POSTES CANADA
Postage paid / Port payé
Publications Mail / Poste-publications
40112378

MTO Investigates New Cathodic Protection Systems

Revolutionising Bridge Rehabilitation



Workers place the activated overlay of a new sacrificial anode cathodic protection system in the North Otter Creek Bridge, Hwy. 9

The Ontario Ministry of Transportation's Materials Engineering and Research Office is currently testing an innovative new method of corrosion prevention that has the potential to transform modern bridge rehabilitation. For decades, the MTO and other jurisdictions have used cathodic protection to arrest the corrosion of reinforcing steel within bridge decks. The implementation of new sacrificial anode systems could dramatically improve and simplify the rehabilitation of some structures suffering from corrosion.

MTO is responsible for 2500 bridges located throughout the province, and is constantly working to ensure proper maintenance measures. The deterioration of concrete bridge decks, caused by corrosion induced by the use of de-icers, has always been a primary concern to bridge personnel. Cathodic protection (CP) has proved to be an effective tool in the fight against corrosion. The theory of CP is to apply sufficient electrical current to the surface of the reinforcement so that corrosion does not occur. In order for CP to function properly the reinforcement must be continuous (electrically connected); this is normally the case for structures with black steel reinforcement. For structures constructed with epoxy-coated reinforcement, the reinforcement may or may not be continuous depending on the condition of the coating. If not, the reinforcement is made continuous before CP is applied. There are two types of CP systems: impressed current, in which an external source of AC power is required to provide electrical current to the embedded reinforcing steel through an anode placed on the concrete surface, and sacrificial anode systems, in which electrical current is generated by the potential difference between the anode and reinforcing steel, and no external source of current is required. Since >

Road Talk is prepared and published quarterly by the Resources Planning Office of the Program Management Branch, Ontario Ministry of Transportation. A circulation of 5,000 is distributed provincially, nationally and internationally. This publication reports on innovations and new technology relating to highway management; the design, construction, operation and maintenance of highway infrastructure.

Readers are encouraged to submit articles, news items and comments to Kristin MacIntosh, Editor, at:
Resources Planning Office
Program Management Branch
Ontario Ministry of Transportation
4th Floor, 301 St. Paul Street
St. Catharines, ON, Canada L2R 7R4
Phone: 905.704.2645
Fax: 905.704.2626
Kristin.MacIntosh@mto.gov.on.ca

Crown copyright reserved, Ontario Ministry of Transportation. Contents of this newsletter may be reproduced with appropriate attribution to the ministry. Please send a copy of the reprinted article to the Editor.

Opinions, conclusions, or recommendations found herein are those of the authors and do not necessarily reflect those of the Ontario Ministry of Transportation. Products referred to in this publication are for information purposes only and should not be considered a product endorsement.

Road Talk Advisory Committee

Kristin MacIntosh, Editor, Program Management Branch

Marco Cacciacarro, Junior Editor, Program Management Branch

Malcolm MacLean, Director, Construction & Operations Branch

Brian Peltier, Director, Engineering Standards Branch

Klari Kalkman, Communications & Training Coordinator, IFIS Project Office

Cindy Lucas, Executive Assistant, Policy, Planning and Standards Division

Patrick Helferty, Program Development Officer, Kingston, Eastern Region

Dan Preley, Project Engineer, Thunder Bay, Northwestern Region

Nick Close, Principal Landscape Architect, Maintenance Office

Vic Ozymtchak, Maintenance Officer, Maintenance Office

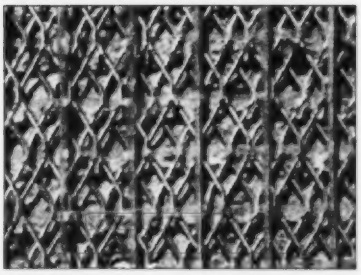
Tony Masliwec, Research Engineer, Materials Engineering and Research Office

Frank Hull, Ontario Good Roads Association

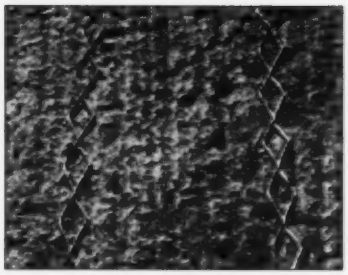
Rob Bradford, Executive Director, Ontario Road Builders Association

Technology Transfer is a communication process by which information, regarding an improvement in a product or method, is exchanged and implementation into practice is facilitated.

Ontario



Anode System 1: Galvashield mesh anode, with zinc and glass fibre mesh.



Anode system 2: Galvashield strip anode, with zinc "chain" anode.

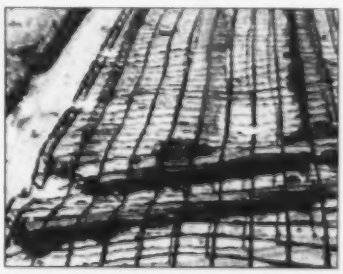
> 1974, only impressed current systems have been installed in Ontario bridge decks.

Impressed current systems require an uninterrupted AC power supply and ongoing monitoring and maintenance if they are to provide effective corrosion protection. This requires dedicated personnel and has significant ongoing operating costs. The recent development and commercial availability of new sacrificial anode technologies prompted the MTO to install and evaluate three new sacrificial anode systems to determine their potential for future ministry use.

Three trial systems were installed in September 2003 at the North Otter Creek Bridge on Highway 9, in Southwestern Region. The anodes were installed by the anode suppliers' representatives to ensure proper handling. The three proprietary systems utilizing zinc anodes - Galvashield mesh and strip anodes and a Galvostrip anode - all operate on the same principle: two dissimilar metals are electrically connected and current flows from the more "active" metal to the more "passive" due to the difference in their electrical potential. In these systems, electrons pass from the more active zinc metal of the anodes to the less active steel of the reinforcing bars. This arrangement polarizes the steel and protects it from corrosion.

A previously conducted survey to assess the condition of the North Otter Bridge indicated that 88% of the concrete deck had readings suggesting a high probability of corrosion; this made it an ideal demonstration site for the new sacrificial anode systems. Multiple element probes (MEPs) were embedded in the concrete deck to evaluate the performance of the sacrificial anodes. The early readings, although preliminary, are encouraging. More than sufficient current was being supplied by each of the anodes to meet the criteria generally accepted as indicative of effective corrosion protection. Monitoring will continue over a 4-year period, at the end of which the Concrete Section will prepare a report including evaluation and recommendation of the sacrificial anodes for future ministry use.

Based on their potential to reduce the costs of long-term monitoring and system maintenance and to enhance the durability of Ontario's bridges, sacrificial anode systems may eventually replace impressed current systems as the standard for cathodic protection throughout the province.



Anode System 3: Galvostrip anode, with zinc rods covered by a carbon fibre mesh.

Thanks to Wade Young, Joey Chirico, and Fred Hemstock of Southwestern Region for coordinating the inclusion of the described cathodic protection research activities in a routine bridge rehabilitation project.

For information, contact Frank Pianca, Materials Engineering and Research Office, (416) 235-4691, or Frank.Pianca@mto.gov.on.ca.

Hand-held Data Entry Tablet

Tablet PCs Transform Bridge Inspection

Ontario's 2800 highway bridges are inspected every two years using the recently developed Windows 2000-based Bridge Management System (BMS). This system records and tracks the condition of dozens of components in each bridge and can provide an instantaneous picture of the current state of bridges in the province, and facilitates the planning of repairs and replacement. The volume of data that must be recorded and input into the database is enormous. The data must be recorded manually on paper in the field and then keyed into the system upon returning to the office, a factor that impedes the BMS, as well as most bridge management systems in use throughout North America. This duplication results in a waste of technical resources.

MTO's five Regional Structural Sections, who are responsible for bridge inspection operations, recognised some years ago that system efficiency could be improved by automating the field acquisition of data. While the approach made sense in theory, the primary stumbling block was that no existing hardware was powerful enough to run the full BMS. This meant that an alternate data acquisition interface would have to be developed.

The recent advent of new tablet PCs changed this. These units, which resemble clipboards in appearance, were developed to take advantage of new Windows technology. The portable tablets are essentially full performance Pentium PCs operating with Windows 2000 or XP. Since BMS operates in Windows 2000, it seemed logical that it could be installed, in whole, on one of the Tablet PCs and used in the field.

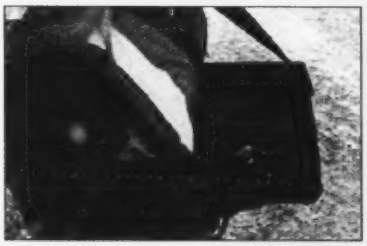
In early 2003, Northwestern Region Structural Section, in collaboration with the Regional IT Office, spearheaded a pilot project to do just that. There are a number of manufacturers of Tablet PCs. The Fujitsu Stylistic 4000 was found to be the most cost effective unit that could still use Windows 2000, which was necessary for the BMS. Initial office trials were extremely encouraging, as the BMS loaded and operated flawlessly. Once the BMS was loaded onto the tablet, bridge data could be easily entered using the touch screen and digital pen. Also, a keyboard could be pulled up on-screen to facilitate data entry; additionally, the system is fully capable of recognising and interpreting handwriting. Sketches can be attached to inspection files, and the whole system can be converted into a desktop via a docking station.

In spring 2003, the Fujitsu was run through field trials and used to record data for all inspections carried out by the region's bridge inspectors. Each day BMS data for up to 10 bridges was downloaded onto the tablet. As each bridge was inspected, the data was recorded directly onto the tablet and stored in the unit's 32 GB hard drive. Digital photographs were also loaded onto the tablet. The inspectors could have at their disposal not only blank inspection forms, but also previous inspection reports and photographs, in order to track deterioration progress. At the end of the day the data would be backed up onto compact disks via a docking station, and the process was repeated again the following day for the next set of bridge inspections.

The system functioned flawlessly. The tablet was rugged enough for field use, and at a weight of three pounds, was not the least bit cumbersome to users. Data entry was as fast, if not faster, than the old pen and paper approach. Functionally, it truly emulated a clipboard. The technology had one minor inconvenience: there was difficulty reading the screen in direct sunlight. This requires the user to occasionally seek shade under a bridge in order to complete data input. Fujitsu has overcome this problem with the development of a new generation of daylight readable screens.

As a result of Northwestern Region's success in using the BMS data entry tablet, it is expected that all regions and consultants will make the move to this technology in the near future.

Special thanks are owed to Darcy Charrette of the Regional IT Office and Tony Merlo of the Bridge Office for their assistance in the development of this system, and to Richard Gombola of the Regional Structural Section for his perseverance in helping to advance the field of bridge inspection. •



The Fujitsu Tablet used to record data into the BMS.

Fujitsu Stylistic 4000 Tablet.

Complete system with docking station, DVD/CD/RW and wireless keyboard.

For information, contact Ray Krisciunas, Structural Section, (807) 473-2064, or Ray.Krisciunas@mto.gov.on.ca.

Asset Management Update

Infrastructure Debt Index Supports Investment Decisions

One of the key objectives of Asset Management is the ability to assess the long-term impacts of deferred or accelerated funding. With a growing infrastructure system, funding cuts typically have an adverse affect on future asset condition and performance targets (outcomes). Having a multi-year investment plan covering all life cycle costs and all assets enables a jurisdiction to not only minimize adverse outcome impacts, but to assess the future debt and the premium that must eventually be paid to recover.

Combining the multi-year investment plan with sound asset valuation information data allows a jurisdiction to quantify debt versus outcomes and report the findings through an infrastructure debt index over a variety of funding scenarios. The Infrastructure Debt Index (IDI) is the asset's accumulated deterioration divided by the cost to replace the asset. In the example below the IDI = 6,836/45,770 = 15%.

Asset Value In millions	Hwy Surface	Hwy Subsurface	Bridge Deck	Bridge Structure	Land	Land Improvements	Furniture	Buildings	Auxiliary Pavement	Other	Total
Replacement Cost	8,999	10,300	1,741	2,663	4,442	13,326	3,779	93	64	363	45,770
Deterioration	2,480	1,362	447	700	71	896	652	32	25	171	6,836
Current Value	6,519	8,938	1,294	1,963	4,371	12,430	3,127	61	39	192	38,934

The following chart shows the interaction between the growing infrastructure debt (red) and the IDI (yellow bars). The example below shows how a cumulative $410 million dollar need growing at 10% per year outgrows a fixed cumulative $400 million dollar funding level. Over a 15-year period the unfunded infrastructure needs have grown to about $3 billion dollars.

The IDI can be divided into competing infrastructure needs and their interaction modelled:

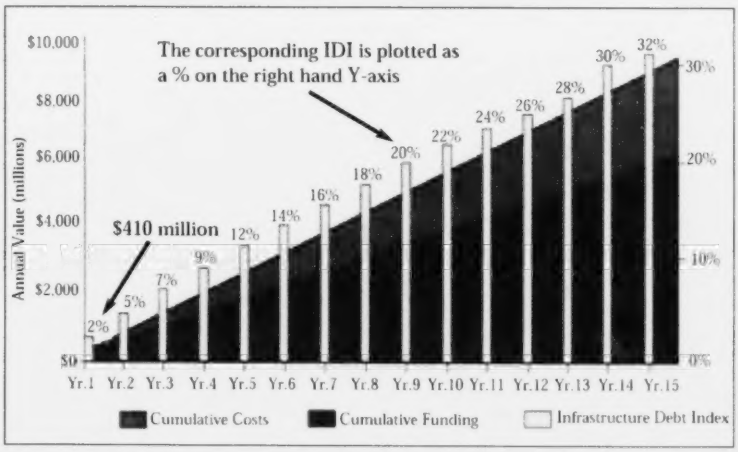
- Ongoing repair
- Reconstruction
- Operational improvements; or
- Expansion

These can be further separated into different asset categories, such as pavement, bridges, ferries, utilities, etc.

Using the debt and IDI information, jurisdictions can assess funding levels in combination with internal and external design and construction capability to eliminate the debt or simply arrest its growth. These funding levels can be seen as steady state funding levels that provide steady state investment outcomes around asset condition and performance.

In this example steady state funding would result in a paralleling of the red area with the blue area at some point in the future. This state will not remove the debt or improve infrastructure condition/performance, and may still result in the growth of operational debt due to status quo safety and congestion problems.

This type of financial analysis may be used successfully with funding agencies to demonstrate the long-term impacts of investment decisions. •



For information, contact Alison Bradbury, Asset Management Group, (905)704-2652 or Alison.Bradbury@mto.gov.on.ca

MTO Granted CSVA Award

The True Value of Value Engineering

The Ministry of Transportation was recently honoured with an Award of Recognition from the Canadian Society for Value Analysis (CSVA) for its active and successful Value Engineering (VE) program. MTO was granted the award for its leadership role in the use of VE in transportation, for its open sharing of VE knowledge with government agencies and municipal governments, and for its active participation in the CSVA.

Carl Hennum, Assistant Deputy Minister of Operations, accepted the award on November 5, 2003 at a CSVA function in Markham, Ontario. Consultants, representatives from the aeronautical, automotive and construction industries, and ministry staff attended the event.

"MTO is proud of its VE program," said Hennum. "Our program has improved and added value to over 50 ministry projects and saved more than $100 million dollars. Over 300 ministry staff have completed a 5-day VE training course and now have the tools to apply Value Engineering to their work. MTO is applying VE to more than just highway projects. Our standards and policies are being improved through the use of VE. VE also supports the introduction of new ideas and innovation, and innovation is a key direction for the Ministry."

The CSVA mission is to promote the application of Value Methodologies for the benefit of governments, industry, practitioners and society. Since the formation of the society in Quebec in 1993, the society and the use of Value Methodologies have spread across Canada. The Ministry has joined with the CSVA in promoting Value Methodologies in Ontario. Through continuing partnerships with the CSVA and municipalities, MTO is expanding both the knowledge and practice of Value Engineering locally, nationally and internationally.

MTO's Value Specialists:

- Barry Buffington, NW Region
- Stephen Holmes, Hwy Design Office
- David Kerr, E Region
- Ted Lane, Hwy Planning and Design
- Mike Pearsall, NE Region
- Dennis Regan, SW Region
- Dan Remollino, Central Region
- Jim Connell, Safey Design Engineer
- Dan Preley, NW Region
- Lola Vaz, Central Region

Value Engineering (also known as Value Analysis, Value Methodology, or Value Management) is a systematic and function-based process to improving the value of products, projects, or processes. VE uses a combination of creative and analytical techniques to identify alternative ways to achieve the desired outcome of a project. A VE study involves a team of people following a structured process that helps team members communicate, understand different perspectives, innovate, and analyze.

Carl Hennum holding the prestigious CSVA Award

The Value Engineering process was formally applied to an MTO project for the first time in 1995, to Northern Region's design of two segments of the Highway 69 expansion. In January 1996, as part of the Ministry's Engineering and Construction Review initiative, MTO established a Value Engineering Task Force, composed of representatives from MTO, the Consulting Engineers of Ontario (CEO) and the Ontario Road Builders Association (ORBA). The task force investigated several initiatives identified as having potential to reduce project costs. It also coordinated Value Engineering Training for contractors, consultants and MTO staff. With the support and advice of American transportation agencies and the Value Engineering community, MTO launched a successful VE program in 1998.

A full-time coordinator in the Highway Design Office supports the VE program, and part-time coordinators in the Regional offices deliver the results. The effectiveness of the VE process was proven in 1998 with the rehabilitation of the Garden City Skyway bridge deck in St. Catharines. This study combined VE and explicit highway safety analysis; this led to the development of an efficient means of traffic control during construction, aggressive rehabilitation strategies, and cost-efficient risk management strategies. Recent studies have produced changes to the interchange configuration at the QEW and Bronte Road (see Road Talk, June 2003), reduced costs for relocating a water conduit at the QEW Red Hill Creek pumping station, improved safety at a rural intersection north of Lindsay and improved operational performance for proposed truck inspection stations.

The Ontario transportation community now benefits from a mature VE program. The Ministry is recognized as a VE leader in transportation in North America and has championed the explicit consideration of highway safety in VE studies. Seven ministry staff have earned certification as Certified or Associate Value Specialists, and Ontario consultants are exporting VE services to other jurisdictions worldwide. Ontario's construction industry has supported VE and saved money for MTO through their contribution of numerous cost-saving Value Engineering Change Proposals.

The CSVA award is a testament to the Ministry's determination to improve the overall value of its projects and to enhance the design, construction and efficiency of its operations. •

For information, contact Steve Holmes, Highway Design Office, (905) 704-2286, Steve.Holmes@mto.gov.on.ca

Pavement Marking Innovations

Paving the Way for Progress

MTO has an obligation to continuously work to improve the safety of Ontario's roadways. The Ministry's proactive approach towards developing new and better pavement marking materials reflects this primary objective. Pavement markings, such as centrelines, lane lines and edge lines, aid the motorist in safely navigating the roadway, and are essential to road safety. The development of pavement marking materials lies under the jurisdiction of the Maintenance and Materials Engineering and Research offices.

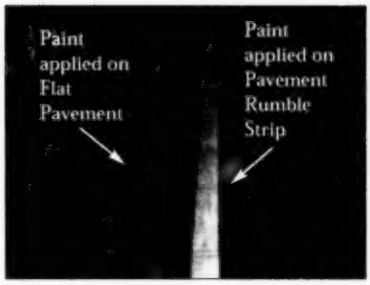
The Ministry has had test sites of different pavement marking formulations and glass beads for over thirty years, to monitor and assess their wear, visibility, and retroreflectivity. Glass beads cause the markings to be retroreflective, which means light from the vehicle's headlights entering the glass beads are reflected back to the driver's eyes. Over the years, many alterations have been made concerning the type, quality and the manner in which the markings are applied. MTO's latest test deck in the Eastern Region on Highway 401 Eastbound features many such changes. Pavement marking manufacturers from around the world supply a variety of materials for this site, to have their product evaluated and approved for use on provincial highways.

The transverse marking on the Highway 401 Eastbound test deck.

In 2003, over 500 markings of paint, two-component material, thermoplastic and tape were applied to the East 401 test deck. In addition to testing material performance, new pavement marking application technologies were tested at this location. Traditional materials are applied by paint spray equipment, and the resulting markings are relatively flat. Under wet conditions they provide negligible retroreflectivity. In an effort to improve wet retroreflectivity, textured markings are currently being tested and evaluated. These markings require different application techniques, for instance, a die that produces a stamped pattern of material, or the material is flung onto the roadway surface to create "hills" for the water to pond between. This allows headlight beams to reflect back from a hill that is not covered by water.

In another effort to improve wet retroreflectivity, a trial of applying conventional water borne paint on a pavement rumble strip has been initiated. As a result of the application to this textured surface, a profile marking is produced. Preliminary results indicate that the wet retroreflectivity of the rumble strip markings is significantly better than conventional flat markings.

Several other pavement marking test sites are located in the Eastern Region. Durable water paint is being tested on 2 different sites: Highway 60, West of Renfrew and on Highway 37, South of Tweed. This paint is applied at twice the thickness of regular water borne paint and uses a bigger glass bead. These markings did not require re-striping for three years - generally, water borne paint markings are re-striped on an annual basis. The retroreflectivity was good and the wear was exceptionally low during this period. As a matter of fact, the Highway 60 Eastbound edgeline retroreflectance readings were a hundred units higher than some of the adjacent two-week-old regular water borne paint markings.



Night image of water borne paint applied to pavement strips on the Highway 401 test deck.

The Ministry is always looking for solutions concerning the treatment and marking of different pavement surfaces. Traditional marking material does not perform well on surface treated pavements - the paint wears off of the coarse pavement surface over a very short period of time. New spray thermoplastic materials and a new application method are being evaluated on another section of Highway 28 east of Bancroft. The material is applied by a special pavement marking striper at 232°C, and at a thickness of 1.5 or 2.5 mm. Additionally, products from two different manufacturers and two different bead manufacturers are being tested. The results to date indicate that there is a significant improvement in the wear and daytime appearance of the markings over materials used in the past. Retroreflectivity has improved but there is still opportunity for greater advancement.

Another material currently under evaluation for this pavement type is durable water borne paint. A test on Highway 28, east of Bancroft, was initiated in 2003. Only Ontario and Texas have tested this class of paint on this pavement type. The markings are currently being monitored and results will be reported in a future issue of Road Talk. •

For information, contact Grant Ridley, Materials Engineering and Research Office, (416) 235-3728, Grant.Ridley@mto.gov.on.ca, Barry Gray, Contracts Office, (905) 885-6381, Barry.Gray@mto.gov.on.ca, or Dave Norlock, Contracts Office, (613) 545-4669, Dave.Norlock@mto.gov.on.ca

Canadian Differential Global Positioning System

Innovative Service Improves GPS Accuracy

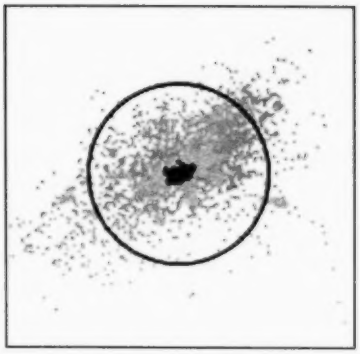
The Global Positioning System (GPS), a worldwide radio-navigation system, is the tool of choice to collect spatial data for Geographic Information Systems (GIS). GIS data collected with GPS can support a variety of activities, including mapping and spatial analysis.

A stand-alone GPS receiver provides accuracies of approximately 5-15 metres in relation to the global reference frame; however, GPS positioning is subject to several error sources, such as atmospheric effects, satellite orbits and satellite clocks. These factors cause errors in the range-to-satellite, which amount to errors in position. Differential GPS (DGPS) corrections can be used to reduce these errors.

The MTO, in partnership with the Ministry of Natural Resources (MNR), other provinces, territories and the federal government, have developed a new differential correction service to produce DGPS corrections, thereby increasing GPS standalone accuracy to about 1-2 metres (for high quality GPS receivers). The Canadian Differential Global Positioning System, or CDGPS, is the result of four years of development. The CDGPS radio receives a DGPS correction model via the MSAT-2 geostationary satellite, calculates corrections localized to the user, and outputs these corrections to a GPS receiver in standard format.

This free service is available for the entire Canadian landmass, including the far north. Other free DGPS services, such as the marine beacon and Wide Area Augmentation System (WAAS), fall short in this respect. Other commercial services involve yearly subscription plans in order to receive corrections.

The radio has a one-time cost of about $1,500. This does not include the cost of GPS equipment. After purchase, the service is free of charge.



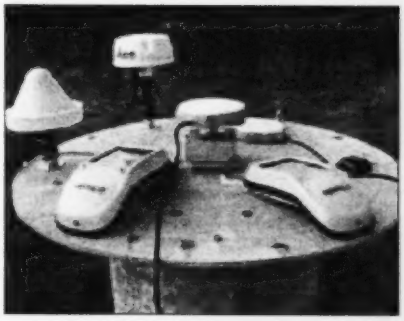
The accuracy of: a low cost GPS receiver (grey), b) a high quality GPS receiver without CDGPS (green) and c) the same receiver with CDGPS (black). The plot shows deviations from a known point over a 6 hour period (the black circle has a 10-metre radius).

CDGPS is the only service that provides corrections yielding positions directly relating to the Canadian Spatial Reference System - North American Datum 1983 (NAD83). WAAS, for example, outputs positions on the World Geodetic System 1984, which is different from NAD83 by as much as a metre.

CDGPS was declared operational in October 2003. Shortly after, the Geomatics Office conducted several tests to determine the increase in accuracy possible using CDGPS corrections with various grades of GPS receivers under different conditions.

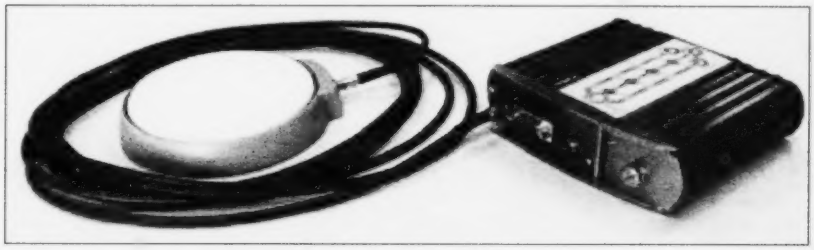
The tests confirmed the expected accuracy of about 1.5 metres for high quality GPS receivers using CDGPS.

What this means for the MTO is that anyone can purchase a standard piece of equipment to augment a high quality GPS receiver, in order to achieve metre-level positioning for their GIS data or mapping products. The development of CDGPS technology represents a progressive movement to enhance existing GPS positioning. •



The test configuration consisting of 5 different GPS receivers (some with and some without CDGPS). The receivers were set over a precisely surveyed point, for the purpose of comparing accuracy.

For information, contact Robin Poot, Geomatics Department, (905) 704-2308, Robin.Poot@mto.gov.on.ca, or visit http://intra.mto.gov.on.ca/divsites/sites/pps/esb/go/index.htm and www.cdgps.com



The CDGPS receiver (grey) and antenna (white), which can be connected to almost any GPS receiver.

PIARC World Road Congress

Supporting Ontario's Innovative Companies

Carl Hennum staffing Team Ontario's booth.

Team Canada booths.

In October 2003, the Ontario Ministry of Transportation, in partnership with a number of prominent Ontario transportation companies, attended the 22nd annual PIARC (Permanent International Association of Road Congresses) World Road Congress held in Durban, South Africa. As a leading jurisdiction in road safety and innovation, this was an excellent opportunity for both the MTO and Ontario transportation companies to showcase their knowledge and expertise.

With over 3000 attendees from over 120 countries, the conference assembled the world's leading transportation experts from industry and government. The Congress provided direct access to decision-makers from around the world, professionals looking for "ready-made" transportation solutions. During the week, companies were provided numerous opportunities to not only showcase expertise and products, but also to connect with potential customers from around the world. In a recent follow-up meeting with the Ministry of Transportation, Ontario companies discussed the many contacts they made, and the potential new markets that are now open to exploration. Six Ontario transportation companies are now pursuing worldwide contacts in many fields, including engineering, pavement management and the high tech design and manufacturing of automotive and industrial equipment. One company summarized the experience: "The cost of participating in PIARC was less than the cost of advertising in trade magazines, and gave much broader exposure."

Team Ontario was led by MTO's Carl Hennum, Assistant Deputy Minister of Operations, and Ministry of Economic Development and Trade's Bill Saunderson from Ontario Exports Inc. Six transportation companies from throughout the province joined the trade mission: Applanix, Cansult, Heat Design Equipment, John Emery Geotechnical Engineering, Matco Industries and Roadware. These companies brought expertise from various fields, including surveying, specialized products such as infrared asphalt heating equipment, the design of electronic modules and deep experience in transportation infrastructure. Over 2000 pieces of promotional material were handed out to attendees by Team Ontario.

As part of its mandate, the MTO Policy Coordination Office provides assistance to Ontario companies in their pursuit of international projects. This assistance includes leading teams to international conferences, such as the PIARC World Road Congress, meeting with delegations from around the world, including Asia and Europe, and providing letters of support when Ontario companies bid for contracts on international projects. •

For information, contact Gabija Petrauskas, Policy Coordination Office, (416) 212-1913, Gabija.Petrauskas@mto.gov.on.ca, or Byron Perry, Policy Coordination Office, (416) 212-1918, Byron.Perry@mto.gov.on.ca

Reader Response

Please help Road Talk become more effective

Send us any ideas, comments, or suggestions concerning local innovations, workshops, or seminars that you would like to see included in future issues.

By Email:
Kristin.MacIntosh@mto.gov.on.ca
By Mail:
Ontario Ministry of Transportation
Resources Planning Office
Program Management Branch
4th Floor, Garden City Tower
301 St. Paul Street
St. Catharines, Ontario, L2R 7R4
By Fax: 905-704-2626

Get Your Electronic Subscription Today!

Road Talk is now available electronically. Setting *Road Talk*'s electronic distribution in motion means faster delivery of the latest news on transportation technology in Ontario and easier mobility of the newsletter among your colleagues, leading to more widespread and efficient information sharing.

If you are a subscriber and would like to enjoy the convenience of receiving *Road Talk* electronically, please send your e-mail address to **Kristin.MacIntosh@mto.gov.on.ca** and specify "Electronic Subscription" as the subject.